

CHAPTER I

SECTION 2

SAFETY PLANNING AND FIELD OPERATIONS

I.2.A GENERAL SAFETY CONCERNS AND PROCEDURES

I.2.A.01 As a general rule, all UXO and discarded MM (DMM) will be blown in place (BIP). This is the safest method to effect final disposition of munitions. Engineering controls may be required based on site-specific conditions. If authorized, UXO and DMM may be moved within the grid found for consolidated demolition shots. If a separate demolition area is set up within the Munitions Response Area (MRA)/MRS for recovered MEC, then the provisions of EP 1110-1-17 apply.

I.2.A.02 All MEC will be destroyed daily unless circumstances beyond the contractor's control (such as unexpected weather storms, unavailability of donor explosives, etc.) preclude their destruction. If a MEC item cannot be destroyed on the day of discovery, then the item will be secured and guarded until destruction can be accomplished. Under no circumstances will MEC be left unsecured overnight.

I.2.A.03 MEC operations will not be conducted until all applicable plans for the project in question are prepared and approved. Plans will be approved IAW ER 1110-1-8153 and ER 200-3-1. These plans will be based upon the concept of limiting exposure to the minimum number of personnel, for the minimum amount of time, to the minimum amount of MM consistent with safe and efficient operations.

I.2.A.04 Only UXO-qualified personnel will perform UXO procedures. As an exception, a UXO Technician I may assist in the performance of UXO procedures when under the supervision of a UXO Technician II or higher. Non-UXO-qualified personnel who have been determined to be essential for the operations being performed may be utilized to perform UXO-related procedures

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when supervised by a UXO Technician III or higher. All personnel engaged in field operations will be thoroughly trained and capable of recognizing the specific hazards of the procedures being performed. To ensure that these procedures are performed to standards, all field personnel will be under the direct supervision of a UXO Technician III or higher. > **See DDESB TP 18 for UXO personnel ratings and qualifications.**

I.2.A.05 Prior to any action being performed on an ordnance item, all fuzing will be positively identified, if it is possible to safely do so, without disturbing the ordnance item. This identification will consist of fuze type by function and condition (armed or unarmed) and the physical state/condition of the fuze, i.e., burned, broken, parts exposed/sheared, etc.

I.2.A.06 Generally, MEC operations will be conducted only during daylight hours.

I.2.A.07 The contractor will propose a workweek schedule for each project. The proposed schedule will be submitted to the CO for approval. The CO will seek the concurrence of the PDT and resolve any other comments before making the decision to accept or reject the schedule. If the schedule is rejected, the contractor will propose a new schedule and the same process will be repeated until an acceptable schedule is approved.

I.2.A.08 There are many factors that need to be considered when developing a project schedule. A few of these factors are weather/climatic conditions, terrain, amount and type of munitions expected, available daylight, public impacts or concerns, and customer requirements. The contractor and PDT need to analyze their project dynamics to determine the appropriate schedule for their project.

I.2.B UXO/MEC ADDITIONAL PRECAUTIONS

I.2.B.01 Every effort will be made to identify a suspect MM. Under no circumstances will any MEC be moved in an attempt to make a positive identification. The MM will be visually examined for

markings and other external features such as shape, size, and external fittings. If an unknown MM is encountered, the on-site USACE representative will be notified immediately. If there is no onsite USACE representative, the MM Remedial Action District, MM Design Center, or the EM CX will be notified as soon as possible. > **See Table III.1.**

I.2.B.02 If research of documentation is required, it will be initiated by the EM CX.

I.2.B.03 Following is additional guidance for the safe handling of MEC:

- a. Projectiles containing base-detonating fuzes are to be considered armed if the round has been fired.
- b. Arming wires and pop out pins on unarmed fuzes should be secured prior to moving MEC.
- c. Do not depress plungers, turn vanes, or rotate spindles, levers, setting rings, or other external fittings on MEC. Such actions may arm or activate the items.
- d. Do not attempt to remove any fuze(s) from MEC. Do not dismantle or strip components from any MEC.
- e. UXO personnel are not authorized to render inert any MM found on a USACE project location.
- f. MEC will not be taken from the project property as souvenirs/training aids.
- g. Civil War era ordnance will be treated in the same manner as any other MEC.

I.2.B.04 Prior to entering a MRA or MRS containing Improved Conventional Munitions (ICMs) or submunitions, a DA waiver will be obtained by the affected installation or the executing MM Remedial Action District for Formerly Used Defense Sites (FUDS)

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properties. The waiver will be obtained IAW the requirements listed in DA Pam 385-63. The waiver will be routed through the EM CX for concurrence on FUDS properties. If an ICM or submunition is found at a project property not previously known to contain ICMs or submunitions, work will cease. If the item is found as a result of a munitions response to MEC project, then the team that discovered the item will perform the disposal. If the item is found as a result of some other activity (such as construction support), then the notification and disposal procedures identified in the approved WP will be used to dispose of the item. The discovered item will be identified, then properly disposed of (including guarding the item if disposition is to be delayed). Work will resume only when an ICM waiver has been obtained. For guidance on the preparation of waiver requests, contact the EM CX.

I.2.B.05 If at any time munitions with unknown fillers are encountered during conventional munitions response to MEC project activities, all work will immediately cease. Project personnel will withdraw along cleared paths upwind from the discovery. A team consisting of a minimum of two (2) personnel will secure the area IAW the provisions identified in the approved WP to prevent unauthorized access. Personnel should position themselves as far upwind as possible while still maintaining security of the area. Personnel who could have been exposed to the unknown filler will not be released from the site until the presence of contamination has been verified by the 20th Support Command, 22nd Chemical Battalion, U.S. Army Technical Escort (TE).

I.2.B.06 On FUDS properties, the UXO team will notify the local Point of Contact (POC) designated in the WP. The local POC will facilitate the EOD response, and two (2) personnel will secure the location until the EOD unit's arrival. If the local POC designated in the WP is not the local law enforcement agency, then the local POC will inform the local law enforcement agency of the discovery if necessary. The EOD unit will notify the TE and secure the area until TE's arrival. After notifying the local law enforcement agency (when necessary), the executing MM Remedial Action District will notify their safety group and the EM CX of the actions taken. > **See**

EP 75-1-3 for more detailed instructions on the procedures to take in the event munitions with unknown fillers are encountered on FUDS properties.

I.2.B.07 Do not have munitions with unknown fillers exposed to direct sunlight after excavation. Some fillers can detonate with the temperature change.

I.2.B.08 On active or Base Realignment and Closure (BRAC) installations, the UXO team will notify the POC designated in the WP.

I.2.B.09 Avoid inhalation and skin contact with smoke, fumes, and vapors of explosives and related hazardous materials.

I.2.B.10 UXO are the most dangerous MM that may be encountered. All MM, regardless of their appearance or condition, will be considered dangerous and managed as UXO until assessed otherwise by a UXO-qualified individual. MM that have experienced abnormal environments such as demilitarization by open burning, open detonation, accidents, fires or where components have been armed or affected by certain tests (e.g. fuze arming tests, jolt and jumble tests) are very unstable.

I.2.B.11 Do not rely on the color-coding of MM for positive identification. MEC having incomplete or improper color codes have been encountered.

I.2.B.12 Avoid approaching the forward area of a MM until it can be determined whether or not the item contains a shaped charge. The explosive jet, which is formed during detonation, can be lethal at great distances. Assume that all shaped-charge munitions contain a piezoelectric (PZ) fuzing system until investigation proves otherwise. PZ fuzing systems are extremely sensitive and they can function at the slightest physical change and can remain hazardous for an indefinite period of time. In some cases, merely casting a shadow across a PZ fuze can cause it to detonate.

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I.2.B.13 Approach an unfired rocket motor at a 45-degree angle from the rear. Accidental ignition can cause a missile hazard and hot exhaust.

I.2.B.14 Do not expose unfired rocket motors to any electromagnetic radiation (EMR) sources. > **See DA Pam 385-64 for safe separation distances from various sources of EMR.**

I.2.B.15 Consider an emplaced landmine to be armed until proven otherwise. It may be intentionally booby-trapped. Many training mines contain spotting charges capable of inflicting serious injury.

I.2.B.16 Assume that a practice MM contains an explosive charge until investigation proves otherwise. Expended pyrotechnic and practice devices can contain red phosphorous or WP residue. Due to incomplete combustion, this residue may re-ignite spontaneously if the crust is broken and exposed to air.

I.2.B.17 Do not approach a smoking WP munition. Burning WP may detonate the explosive burster charge at any time.

I.2.B.18 Foreign ordnance was shipped to the United States for exploitation and subsequent disposal. Every effort will be made to research all applicable documentation prior to commencement of a project involving foreign ordnance.

I.2.B.19 Appendix H contains emergency POCs.

I.2.C CONSOLIDATION OF MEC PENDING DISPOSAL

I.2.C.01 As a general rule, all UXO and DMM will be detonated in the original position found. This is the safest method to effect final disposition of munitions. Engineering controls may be required based on site-specific conditions. If authorized by the approved WP, UXO and DMM may be moved to a consolidated area for demolition IAW Procedures for Demolition of Multiple Rounds (Consolidated Shots) on Ordnance and Explosives Sites. > **See paragraph I.2.C.03.**

I.2.C.02 If the decision is made to consolidate the MEC that is acceptable to move, the following two conditions must be met:

- a. The MEC cannot be left unattended or unsecured in the grid overnight.
- b. If the MEC is to be secured within a magazine pending disposal, the magazine must be cited for this use in the project ESPs and/or safety submissions.

I.2.C.03 Procedures for Demolition of Multiple Rounds (Consolidated Shots) on Ordnance and Explosives (OE).

- a. This document covers procedures for intentional detonations only.
- b. The minimum separation distance for all personnel will be the greater of the overpressure distance or the appropriate fragment range as determined by the maximum fragment range or the mitigated fragment range.
- c. Overpressure Distance. The allowable overpressure distance will be determined as the scaled distance, K328, based on the total NEW of all munitions plus the initiating explosives.
- d. Fragment Criteria:
 - (1) Maximum Fragment Range. The maximum fragmentation characteristics shall be computed IAW DDESB TP 16. The maximum fragment range shall be computed using these fragmentation characteristics with a trajectory analysis such as the computer software TRAJ. The maximum fragment range shall be the maximum fragmentation distance computed for the MGFD for a MEC area at a site, and this shall be the maximum fragment range for a consolidated shot.
 - (2) Fragment Mitigation. Fragment mitigation may be provided by an appropriate DDESB approved engineering control. Typical engineering controls for intentional detonation include tamping,

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sandbags, and water mitigation. The design of such an engineering control shall be based on the maximum fragmentation characteristics of the MGF. The NEW used for the design of the engineering control shall be the total NEW of all munitions plus the initiating explosives. Engineering controls not already approved by DDESB may be submitted (along with appropriate technical data) as part of a site-specific explosive safety submission for use at that site. Engineering controls will not be put into use until approved by DDESB and specific applications verified by the appropriate agency; for example, the EM CX verifies applications for the U.S. Army Corps of Engineers.

e. Initiation. The consolidated shot shall be initiated in such a manner that detonation of all munitions is simultaneous.

I.2.D TRANSPORTATION OF MM OFF-SITE

I.2.D.01 MM Transportation, Off-site. USACE contractors are prohibited from transporting UXO offsite for destruction until the provisions of Technical Bulletin (TB) 700-2 have been met. This TB states UXO must be examined by personnel qualified in EOD before transporting it from the installation or FUDS. The EOD unit will attempt to identify the ordnance and confirm in writing that the material is safe for transport.

I.2.E TRANSPORTATION OF MM ON-SITE

I.2.E.01 General. The following safety procedures will be followed for the transportation of MM that have been authorized to be moved/transported onsite:

I.2.E.01.01 Do not transport WP munitions unless they are immersed in water, mud, or wet sand.

I.2.E.01.02 If loose pyrotechnic, tracer, flare, or similar mixtures are to be transported, they will be placed in Number 10 mineral oil or equivalent to minimize the fire and explosion hazards.

I.2.E.01.03 Incendiary-loaded munitions will be placed on a bed of sand and covered with sand to help control the burn if a fire should start.

I.2.E.01.04 If an unfired rocket motor will be transported, it will be positioned in the vehicle parallel to the rear axle and secured in place with sandbags. This will afford maximum protection for the personnel operating the vehicle.

I.2.E.01.05 If a base-ejection projectile is to be transported to a disposal facility, the longitudinal axis of the projectile will be oriented parallel to the rear axle and secured in place with sandbags. This will afford maximum protection for the personnel operating the vehicle.

I.2.E.01.06 MEC with exposed hazardous fillers, such as High Explosives (HE), will be placed in appropriate containers with packing material to prevent migration of the hazardous fillers. Padding will be added to protect the exposed filler from heat, shock, and friction.

I.2.F EZ OPERATIONS > Refer to ER 385-1-95.

I.2.F.01 DA Pam 385-64 and ER 385-1-95 require the contractor to establish an EZ around each work area where MEC procedures are being performed. The EZ is established to protect non-essential personnel from the damaging effects of blast overpressure and fragmentation should an unintentional detonation occur. The EZ will be delineated in the approved WP, ESP, and ESS. Calculating EZ's with respect to intentional and unintentional detonations is discussed below. Approved engineering controls may be used to reduce the EZ for either intentional or unintentional detonations. On munitions response to MEC projects, it is the responsibility of the contractor's UXOSO to establish the EZ for each MRS.

I.2.F.01.01 For MEC items, to determine the Minimum Separation Distances (MSD), the following applies:

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a. Intentional Detonations. The greater of the K328 overpressure distance based on the total NEW of the demolition shot, or the maximum fragment range - horizontal distance (MFR-H), will be used, as identified in DDESB TP 16. These distances may be reduced using DDESB-approved engineering controls.

b. Unintentional Detonations. The MSD for unintentional detonations will be the greater of the K40 overpressure distance or the hazardous fragmentation distance (HFD) of the MGF, as specified in TP 16. Two exceptions to this involve MEC identified as ICMs > **See DA PAM 385-63** and mechanized MEC operations > **See Chapter 12, DoD 6055.09-STD**. In this case the MFR-H will be used for this MSD.

c. If the identity of the MMs is unknown, use either Table 4-1, Generic Fragment Parameters Versus Item Diameter or Table 4-2, Generic Fragment Parameters Versus Item Net Explosive Weight, DDESB TP 16, to determine the appropriate MSD pending a specific calculation for the MEC item. Generally, use the Robust column. Typically, you will get a shorter MSD using Table 4-2, if the NEW is known. Normally, the diameter of the munition will be the one known parameter. The EM CX can assist the district/division in this process.

I.2.F.01.02 On RCWM project properties, EZ's will be established IAW EP 75-1-3.

I.2.F.01.03 TSDs. When multiple teams are working onsite, a TSD will be established. The minimum TSD will be the K40 (1.2 pounds per square inch) overpressure distance.

I.2.F.02 While MEC procedures are being conducted, only personnel essential for the operation and authorized visitors will be allowed to enter an EZ. When nonessential personnel enter the EZ, all MEC procedures will cease. In addition to this work stoppage, the following actions will be taken:

I.2.F.02.01 The individual(s) will receive a safety briefing and sign the visitors log prior to entering the EZ.

I.2.F.02.02 The individual(s) will be escorted by a UXO-qualified individual.

I.2.F.02.03 All personnel working within the EZ will comply with the following:

a. There will be no smoking within the EZ, except in areas designated by the UXOSO.

b. There will be no open fires for heating or cooking (gas stoves, grills, etc.) within the EZ, except where authorized by the UXOSO. If open fires for heating or cooking are to be allowed on the project property, then the appropriate fire fighting measures and plans need to be established in the approved WP.

c. During geophysical detection operations, personnel will not wear any metal (e.g., rings, watches, keys, etc.) that would interfere with the instrument's operation.

I.2.F.02.04 Any subsequent changes to EZ distances, relative to explosives safety quantity distances, as approved in the original ESS/ESPs for the project site, will require an amendment to the approved document. This amendment must be processed through the same channels as the original safety document.

**I.2.G ESSENTIAL PERSONNEL AND AUTHORIZED VISITORS >
*Refer to EP 385-1-95a.***

I.2.G.01 Essential Personnel are defined as USACE and contractor project personnel necessary for the safe and efficient completion of field operations conducted in an EZ. Examples are: contractor work team members including the UXO Safety Officer (UXOSO), UXO Quality Control Specialist (UXOQCS), SUXOS, and a USACE OESS, and geophysical equipment operators.

I.2.G.01.01 Tasks not necessary to the operation will be prohibited within the immediate area of the hazard produced by the operation. For USACE MMRP projects, multi-discipline and multiple MEC

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project teams performing tasks required to execute the project may be in the EZ while MEC procedures are being performed as long as TSDs are maintained. This must be coordinated with the UXOSO and OESS.

I.2.G.02 Authorized Visitors are defined as DoD, DA, USACE, or other personnel (EM CX, DDESB, HQ Safety, etc.) conducting project or mission related functions, such as Quality Assurance Representatives (QARs), safety and quality inspectors (including geophysicists performing quality assurance functions), and project management. Authorized visitors must be escorted while in the EZ and be approved for entry into the EZ IAW this guidance. No more than 2 authorized visitors will be permitted in the EZ at any given time. Authorized visitors must comply with waiver requirements in EP 385-1-95a.

I.2.G.02.01 Explosives Safety Policy.

a. IAW DoD 6055.09-STD and DA Pam 385-64, it is DoD and DA policy to limit the exposure to a minimum number of persons, for a minimum time, to the minimum amount of ammunition and explosives (such as MEC) consistent with safe and efficient operations.

b. Personnel limits, to include authorized visitors, will be clearly posted for each operation and must not be exceeded during the operation. (For USACE MMRP projects, personnel limits are based on the approved WP designating the number and types of teams that may be required to complete the field operations.)

I.2.G.02.02 Personnel not needed for the operation will be prohibited from visiting. (For USACE MMRP projects, essential personnel and authorized visitors, as defined in this guidance, may visit the EZ while MEC procedures are being conducted.)

I.2.G.02.03 Responsibilities.

a. Authorized visitors will obtain written approval from the executing district's Safety and Occupational Health Office (SOHO) IAW with EP 385-1-95a.

b. Project team members listed in the QASP do not require additional SOHO approval. They will be considered as authorized visitors when performing assigned quality assurance functions. If a QASP is not available, or personnel are not listed in the QASP, SOHO approval is required.

c. The contractor is responsible for considering all explosives safety policies and principles when making determinations regarding EZ operations and personnel limits.

d. The contractor is responsible for posting personnel limits and ensuring all personnel are aware of and comply with the posted limits.

e. All personnel entering, or working in, EZs are responsible for ensuring personnel limits are not exceeded.

I.2.G.02.04 Requirements and Procedures. All requests for approval as an authorized visitor for entry into the EZ during MEC procedures will be submitted through the Project Manager to the executing district's SOHO for approval. All visitor authorization requests will:

a. Describe the purpose of the visit and the tasks to be performed.

b. Explain why the tasks must be performed during MEC procedures.

c. Specify whether the visit will be a single visit or one in a series of visits.

d. State the frequency of the visits and the time required to perform the task.

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I.2.G.02.05 The on-site UXOSO will ensure:

a. The documentation approving the authorized visitors is reviewed for adequacy based on this guidance and the tasks to be performed. This documentation will become part of the project file.

b. Non-essential personnel, including unauthorized visitors, are prohibited within the EZ where MEC procedures are being performed.

c. All authorized visitors are provided a safety briefing prior to entering the EZ and an UXO-qualified escort regardless of their qualifications.

d. Posted personnel limits are not exceeded while MEC procedures are being conducted. If more than the posted number of personnel are in the EZ while MEC procedures are being performed, MEC procedures must cease and the required number of personnel must leave before they may continue.

e. Personnel limits are posted at or near the contractor's on-site office. As a minimum, the limits should be posted at a central site accessible to all personnel.

f. Personnel limits are a topic covered during the contractor's daily safety briefings.

I.2.G.02.06 Once the personnel limits are established, the contractor has the flexibility to manage team sizes to accomplish the mission provided the personnel limits are not exceeded.

I.2.H ANOMALY EXCAVATION > Refer to EP 385-1-95a.

I.2.H.01 Start all excavations from the side of the anomaly. Carefully dig from the side until identification of the anomaly is made. Excavation operations, whether by hand or Earth-Moving Machinery (EMM), will employ a step-down or offset access method. Under no circumstances will any excavation be made directly over suspected MEC.

I.2.H.02 Clear debris/dirt from the subsurface anomaly only enough to permit identification of the anomaly and to apply the necessary MEC procedure.

I.2.H.03 Move with slow, deliberate motions; avoid abrupt moves.

I.2.H.04 Avoid impacting, jarring, or striking UXO.

I.2.H.05 Do not subject UXO to shock, rough handling, heat, or any other force.

I.2.H.06 Observe EMR precautions IAW DA Pam 385-64.

I.2.I ASSESSING MUNITIONS WITH UNKNOWN FILLERS

I.2.I.01 Procedures for assessing munitions with unknown fillers.
> **See EP 385-1-95a.**

I.2.I.02 For explosives and chemical safety reasons, the complete identification of recovered munitions is required before destruction or disposal. This is particularly true with regard to munitions that can be filled with CWM and could present a downwind chemical vapor hazard.

I.2.I.03 Many munitions have sufficient physical properties (such as design characteristics, markings) that allow USACE OESS and UXO personnel to positively identify the munition and the filler. However, the design or physical condition of some munitions may not allow their complete identification by visual inspection.

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I.2.1.04 Munitions whose external design does not always allow for positive identification of their filler include:

- a. 4.2-inch mortars (M1, M2, and the M2A1 models), and;
- b. Livens projectiles (MK II (M1) and MK IIAI).

I.2.1.04.01 Because the 4-inch Stokes mortar's physical dimensions clearly indicate whether or not it contains a suspect chemical filler (for U.S. manufacture), it is not included in this list. It is recommended this guidance be used for all countries of origin of manufacture for the 4-inch Stokes mortar.

I.2.1.04.02 Because this list is not all-inclusive, the EM CX should be contacted about other munitions when questions arise.

I.2.1.05 The identification of the filler of some munitions is very difficult, if not impossible, through visual inspection when the munition has been used or otherwise impacted (for example, disposed of after ineffective treatment) or exposed to the environment (such as when buried as a means of disposal) for years.

I.2.1.05.01 Only EOD or TE is authorized to determine the most likely filler of these munitions.

I.2.1.05.02 Procedures. When performing munitions responses on USACE project properties, and the filler of a munition listed above cannot be determined, the following procedures will be followed.
> Refer to EP 75-1-2 for additional details on procedures to be followed in the event that munitions with unknown fillers are identified on conventional munitions response to MEC project properties.

- a. On conventional munitions response to MEC project properties, contact the POC identified in the approved WP for performing the assessment or response (i.e., military EOD or TE). Typically, the WP will address how to "safe the hole / item" to

mitigate the possible downwind hazards pending the arrival of the appropriate response personnel.

b. On RCWM projects, TE will normally be present at the project property and will perform the assessment as part of their daily routine and per their procedures.

c. If the assessment has ruled out RCWM as a filler, then the item will be returned to USACE for disposal operations as specified in the approved conventional munitions response to MEC WP.

d. If the assessment indicates RCWM as a filler:

(1) On a RCWM project, TE will package and secure the item per the approved CSS, usually on site.

(2) On a conventional munitions response to MEC project, TE will assume control of the item. > TE may require some logistical support during the assessment process.

e. The use of these procedures is a precautionary measure to confirm that the munition can be safely destroyed, to help ensure that an uncontrolled, unintentional release of CWM does not occur, and to validate site-specific information.

I.2.I.06 It is important that terminology used not cause unnecessary public or regulatory concern. Generally, these munitions should be referred to as munitions with unknown fillers, rather than suspect chemical munitions.

I.2.J MEC DISPOSAL OPERATIONS > Refer to EP 385-1-95a.

I.2.J.01 All disposal operations will be conducted IAW TM 60A-1-1-31, EP 1110-1-17, and the unnumbered U.S. Army Engineering and Support Center, Huntsville (USAESCH), publication entitled "Procedures for Demolition of Multiple Rounds (Consolidated Shots) on Ordnance and Explosives (OE) Sites".

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I.2.J.02 As a general rule, all disposal operations will be accomplished by electrical means to ensure maximum safety. There are exceptions to this requirement in situations where static electricity or EMR hazards are present. Unintentional detonations can occur because of these induced currents (or lightning). The following precautions from DA Pam 385-64 are to be followed:

I.2.J.02.01 Premature detonation of electric blasting caps by induced current from radio frequency signals is possible. Refer to DA Pam 385-64 for minimum safe distance with respect to transmitter power and indication of distance beyond which it is safe to conduct electric blasting even under the most adverse conditions.

I.2.J.02.02 Lightning is a hazard with respect to both electric and non-electric blasting caps. A direct hit or a nearby miss is almost certain to initiate either type of cap or other sensitive explosive elements such as caps in delay detonators. Lightning strikes, even at distant locations, may cause extremely high local earth currents that may initiate electrical firing circuits. Effects of remote lightning strikes are multiplied by their proximity to conducting elements such as those found in buildings, fences, railroads, bridges, streams, and underground cables or conduits. The only safe procedure is to suspend all blasting activities when an electrical storm approaches to within 5 miles of the project location.

I.2.J.02.03 Electric power lines also pose a hazard with respect to electric initiating systems. It is recommended that any disposal operation closer than 155 meters (517 feet) to electric power lines be done with a non-electric system.

I.2.J.03 The only acceptable disposal method is the one stated in the appropriate TM 60 Series manual for specific ordnance types. Any commercial explosives being used will be equivalent to the military explosive required for the disposal operation.

I.2.J.04 If justified by the situation, protective measures to reduce shock, blast overpressure, and fragmentation will be taken. The

EM CX will assist in any design work and will review for approval all proposed protective measures.

I.2.J.05 MSDs for personnel during MEC disposal operations will be IAW DoD 6055.09-STD, TP 16, or the distance provided by the EM CX.

I.2.J.06 During open detonation operations, personnel will be located away from lifting lugs, strong backs, base plates, etc.

I.2.J.07 Once disposal operations are completed, a thorough search of the immediate area will be conducted with a magnetometer to ensure that a complete disposal was accomplished.

I.2.J.08 Inert ordnance will not be disposed of as scrap until the internal fillers/voids have been exposed and unconfined.

I.2.K CELL PHONE USE > Refer to Section 29 and 33 EM 385-1-1.

I.2.K.01 Cell phones with less than one watt shall be kept at least eight feet from a blasting circuit.

I.2.K.02 Contact should not be made between the blasting circuit and the cellular telephone antenna and charging jack.

I.2.K.03 Restrict the use of cellular telephones in the grids and during blasting operations.

I.2.K.04 If it is suspected that a blasting circuit is at approximately the same elevation as a nearby cellular telephone tower's antenna cluster, then the radio frequency field strength measurements should be made at the location of the blasting circuit and competent expert advice should be sought.

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I.2.L OSHA INSPECTIONS

I.2.L.01 In the event an OSHA inspection team comes onto the MMRP site, the following procedures should be followed by the Prime contractor on-site:

- a. Ask the OSHA team for its credentials.
- b. Provide an inbriefing/safety briefing to the OSHA team.
- c. If the OSHA team wants to go into the EZ, explain to them the MEC and MEC-related procedures will have to be shut down while they are in the EZ.
- d. Notify the USACE Project Manager of the presence of OSHA on the project site.
- e. Ensure the OSHA personnel are in the appropriate PPE before allowing them to go downrange. Advise them of the requirements.
- f. Be courteous and give them the assistance necessary during their visit.
- g. Ensure Headquarters USACE Safety Office is advised of the OSHA visit.
- h. Notify the USACE PM and HQUSACE of any findings of non-compliance or non-conformance rendered by the OSHA team.
- i. OSHA does not normally apply to OCONUS work.

I.2.M DDESB VISITS > Refer to DoD 6055.09-STD and AR 385-64.

I.2.M.01 DDESB will periodically visit USACE MMRP sites in order to conduct an ESS. The purpose of the survey is to assess explosives safety conditions with respect to storage, treatment, transportation, handling, and disposal of munitions and explosives

of concern. Typically the survey will include restricted access areas and organizations on site involved in the MEC Response activities.

I.2.M.02 Areas of concern during the survey are:

a. Name of FUDS, official mailing address, and summary of the MEC response effort;

b. Name, rank, position/title, E-mail address, and telephone numbers of key personnel;

c. Provide an up-to-date map showing location of all areas that have MEC activities ongoing dealing with subjects listed in paragraph I.2.M.01;

d. List of operations involving ammunition or explosives scheduled during the survey;

e. Brief summary of explosives accidents that have occurred since the last survey to include cause, damage, and corrective actions;

f. Discussion on any difficulties in achieving compliance with explosives safety requirements due to environmental requirements;

g. Permission for the survey team to photograph areas of interest during the survey;

h. Discussion on other significant problem areas that the DDESB should be aware of or may be of assistance in resolving.

I.2.N EXPLOSIVES STORAGE AND MAGAZINES

I.2.N.01 General. This section applies to MEC and Commercial Explosives Storage. > **See 27 CFR 555, EP 385-1-95a, EM 1110-1-4009.**

I.2.N.02 On DoD installations, DoD 6055.09-STD and Service requirements (Army – AR 385-64; Navy – Naval Sea Systems

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Command Ordnance Pamphlet (NAVSEA) OP 5; Air Force – AFM 91-201) will be met. For the remainder of this pamphlet, reference to DoD standards (such as DoD 6055.09-STD) also implies that Service explosives safety publications will be adhered to. Generally, the contractor may be able to use an existing explosives storage facility on an installation that meets DoD standards. If not, the contractor will establish a temporary storage facility. The compatibility of explosives defined in DoD 6055.09-STD, will be followed. Recovered munitions awaiting final disposition will not be stored with serviceable explosives. Commercial explosives will be assigned a DoD hazard classification (for example, 1.1, 1.2, etc.) and storage compatibility grouping by the USATCES prior to being stored on a military installation. **> See Chapter II, Table II.1 for a current listing of commercial explosives that have been assigned a DoD hazard classification.**

I.2.N.02.01 When a project is being conducted on an installation and the installation has an approved storage facility, and permission to store the demolition explosives in an approved storage facility is obtained from the installation and/or MACOM, as applicable, the explosives will be stored IAW the approved procedures used by the installation. Otherwise, the contractor will establish a temporary storage area using ATF, Type II magazines. Installations require MACOM/DRU approval for storage of commercial explosives. Contact the EM CX for procedures to be used to obtain MACOM/DRU approval.

I.2.N.03 Off DoD installations, the contractor will be responsible for establishing a temporary explosives storage area. This temporary explosives storage area will meet local, state, 27 CFR 555, 29 CFR 1910.1201, and DoD 6055.09-STD requirements to the greatest extent practicable.

I.2.N.04 Temporary Explosives Storage Area.

I.2.N.04.01 Explosives Magazine Siting.

I.2.N.04.02 Explosives magazines on MEC projects are typically BATF Type II magazines. These magazines meet the

requirements of AR 190-11 for the storage of donor explosives and in some cases, the storage of recovered MEC awaiting disposal.

I.2.N.04.03 Explosive safety quantity distances applicable to these types of magazines are specified in DoD 6055.09-STD, Chapter 9.

I.2.N.04.04 HFD. This is the distance all non-project personnel/non-essential personnel will be kept away from the magazine at all times.

a. For bulk donor charges, this distance is determined by the maximum NEW of the donor charges to be stored in the magazine and applying this explosive weight to the Tables in DoD 6055.09-STD. For all Hazard Division 1.1 donor charges, in quantities below 450 pounds, the HFD listed in Table C9.T2, under the "Structures" column will be used for determining this distance. For quantities above 450 pounds, see DoD 6055.09-STD.

b. For recovered MEC awaiting disposal, normally all recovered MEC will be Hazard Division 1.1, per TB 700-2. Determine the maximum NEW to be stored, based on the total of all the NEWs of the MEC items and apply this explosive weight to the Tables in DoD 6055.09-STD. For all Hazard Division 1.1, in quantities below 450 pounds, the HFD listed in Table C9.T2, under the "Open" column will be used for determining this distance. For quantities above 450 pounds, see DoD 6055.09-STD.

I.2.N.04.05 Public Traffic Route Distance (PTRD). This is the distance to be maintained between a Potential Explosive Site (PES) and Public Traffic Route (PTR) exposure.

a. For HD 1.1 in quantities below 450 pounds, this distance is equivalent to 60% of the HFD.

b. There are three categories of traffic density identified in the DoD 6055.09-STD that will have a direct impact on determining this distance.

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(1) High Traffic Density. If the route has 10,000 or more car or rail passengers per day, or 2,000 or more ship passengers per day, then the Inhabited Building Distance (IBD) criteria apply.

(2) Medium Traffic Density. If routes have between 400 and 10,000 car or rail passengers per day, or between 80 and 2,000 ship passengers per day, then 60% of specified minimum fragment distance for IBD applies. As a minimum, these criteria apply to any recreational activity that is extensive and occurs on a regular basis.

(3) Low Traffic Density. If routes have fewer than 400 car or rail passengers per day, or fewer than 80 ship passengers a day, then no minimum fragment distance is required. Minimum distance shall be based on blast criteria (K24/K30).

I.2.N.04.06 Siting the magazine relative to MEC Operations.

a. There are no distance restrictions from the magazine to project personnel conducting project business.

b. MEC operations that could produce an unintentional detonation must be kept at a minimum of K11 distance from the magazine. This K11 distance is determined by taking the cube root of the NEW of the MGF D for the area and applying the K factor to that figure. For example, if the MGF D's NEW was 1 pound of TNT, then the K11 distance for those operations that might produce an unintentional detonation is 11 feet.

c. For MEC operations that involve intentional detonations, those operations must be kept at the MFR-H (for fragmenting munitions) or the K328 distance of the NEW of the munition being disposed, plus the NEW of the donor charge to destroy it.

d. For those MEC operations using engineering controls to reduce the fragmentation distance, adjust these locations accordingly.

I.2.N.04.07 Recovered MEC will not be stored in the same magazine as the donor charges to be used for its disposal.

I.2.N.04.08 It is acceptable to use the BATF Type II magazine with the external cap box mounted on the outside of the magazine and site the unit as one unit, using the combined NEW of both the initiators and the donor charges.

I.2.N.05 Siting Magazines at Operational Installations.

I.2.N.05.01 On-Post Roads. For magazines supporting munitions response to MEC work at operational installations, on-post roads are normally not considered PTRs and no Quantity Distance (QD) applies from the magazine to them. Exceptions are as follows:

a. On-post roads open to the public are PTRs;

b. On-post roads that are closed to the public, but are used by installation personnel who are unrelated to the installation's ammunition mission are considered PTRs.

I.2.N.05.02 Installation Personnel and Operations.

a. Installation ammunition personnel and operations. Site the magazine at the intraline distance to these exposures. >
Magazine distance applies from installation explosives locations to magazines supporting munitions response to MEC projects.

b. Installation non-ammunition personnel and operations. Site the magazine at the IBD to these exposures.

I.2.N.05.03 Lightning Protection for Explosives Storage Areas.

a. Each magazine will be provided lightning protection IAW chapter 12, DA Pam 385-64. The provisions of the National Fire Protection Association (NFPA) 780, which are consistent with Army guidance, may be used to supplement Army guidance where necessary.

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b. DoD 6055.09-STD requires functional lightning protection for all explosives storage areas.

c. Approved explosives storage areas on active installations will have a Lightning Protection System (LPS) installed.

d. Temporary explosives storage areas used to support an on-going project will have a LPS. Existing earth-covered magazines at a FUDS project property will have a LPS.

e. Prior to storing explosives in any magazine with an installed LPS, the system will be inspected and tested to ensure it is functional. Existing facilities without a LPS will have a LPS installed and tested to ensure it is functional prior to storing explosives. Inspection and testing criteria are contained in DA Pam 385-64.

f. NFPA 780 allows the metal walls of the magazine to act as both the air terminal and down conductor of a LPS, provided the portable magazine meets the following criteria: magazines manufactured entirely from metal that are at least 3/16 inches thick and that have doors bonded to the side of the magazine. ATF-approved, portable Type II magazines meet these criteria. Lightning protection is completed by grounding the magazine IAW EM 1110-1-4009, Chapter 11; however, the grounding system will be inspected and tested IAW DA Pam 385-64. The Interim Holding Facilities (IHF) used for Recovered Chemical Warfare Materiel (RCWM) projects do not meet these criteria; therefore, they will have a LPS designed, installed, and tested prior to use, if the IHF is to be sited for explosively-configured RCWM. If the IHF is not sited for explosively configured items, a LPS is not required.

g. When more than one portable magazine is used on a project property, they will be separated by a minimum of 2 meters (6.5 feet) if they are grounded separately, or they will be bonded to a common grounding system if the 2 meter- (6.5 foot-) criteria cannot be met. Fences installed around magazines will be at least 2 meters (6.5 feet) from the magazine or bonded into the grounding system.

I.2.N.06 Munitions Debris (MD) Storage Inside the Fenced Explosives Storage Area. Certified, verified, containerized MD may be stored in the fenced explosives storage area. However, the MD containers will be made of non-flammable materials. Wood or cardboard containers are not acceptable as they constitute a fuel source in case of fire near the magazine.

I.2.N.07 Fire Protection.

I.2.N.07.01 A fire plan for either an on-installation or off-installation explosives storage facility will be prepared and coordinated with the local fire department.

I.2.N.07.02 Clear all combustible material a minimum of 15.25 meters (50 feet) around portable magazines. Do not store any combustible materials within 15.25 meters (50 feet) of any magazine.

I.2.N.07.03 Placarding.

a. On DoD Installations. Affix a fire symbol to the magazine IAW DA Pam 385-64.

b. FUDS and Other Munitions Response to MEC Projects Not on DoD Operational Installations. Placarding of magazines will be performed IAW local rules and regulations.

c. Routine emergency response drills will be conducted IAW the approved WP to familiarize the response personnel with the hazards.

I.2.N.08 Physical Security. A physical security survey will be conducted IAW AR 190-11 to determine if fencing or guards are required. For BRAC or active installations the physical security survey will be coordinated through the Provost Marshall's office. For FUDS, this survey will be coordinated with local law enforcement agencies.

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I.2.N.08.01 Generally, a fence around the magazine is not needed, IAW 27 CFR 555. However, the degree of protection needed to prevent the theft of the MM will be provided.

I.2.N.08.02 USACE contractors must be aware of 49 CFR 172, Subparts H and I concerning the offering, preparing, or transporting of designated hazardous materials, as well as the necessary security requirements.

I.2.N.09 Magazines for Storage of RCWM. > **Refer to EP 75-1-3 for RCWM IHF siting requirements.**

I.2.N.10 Requirements for the physical security of a RCWM IHF are contained in EP 75-1-3.

I.2.O APPROVED ENGINEERING CONTROLS FOR BLAST AND FRAGMENTATION MITIGATION

I.2.O.01 General. DDESB Technical Paper 15 contains a listing of all approved engineering controls.

I.2.O.02 Engineering Controls. Engineering controls are used to mitigate the effects of unintentional or intentional explosions if the calculated MSD for the MEC to be destroyed cannot be met. The primary goals of using engineering controls are to improve personnel safety and/or to reduce the EZ. This section discusses engineering controls that can be used by the PDT for either an unintentional or intentional explosion scenario.

I.2.O.02.01 Engineering Controls for Unintentional Detonations. Engineering controls used for unintentional detonations include various barricades. The PDT should design barricades IAW approved DoD standards. To implement a barricade that has been previously approved by DDESB, the PDT should contact the EM CX. > **See DDESB TP 15.** If a barricade has not been previously approved, a complete structural design package will be submitted to the EM CX as part of the ESP/ESS. The structural design package will include design drawings, design details, calculations, drawings, and relevant testing details. The design will show how

fragmentation is captured and overpressure is reduced. The design package, as part of the ESP/ESS, is forwarded through appropriate channels to DDESB for approval.

I.2.O.02.02 Engineering Controls for Intentional Detonations. The most common engineering controls used during intentional detonations are either soil cover or sandbags. If controls are required for intentional explosions, the MM DC should be contacted to arrange for the preparation of a design (or the review of a design already prepared) with the EM CX.

a. Soil Cover. If soil is proposed to be used over a to-be-detonated MEC item, the PDT may use one of several computerized models to determine the required thickness of soil cover necessary for the intentional detonation of MEC. The Buried Explosion Module (BEM) is one such computerized model. The methodology used in the BEM is documented in DDESB TP 16 and an EXCEL spreadsheet is available with DDESB TP 16 on the DDESB Secure Website.

b. Sandbags. Sandbags may be used for MEC no larger than 155 mm. If sandbags are proposed to be used as an engineering control to mitigate the fragmentation and overpressures generated during an intentional MEC detonation, the PDT should refer to HNC-ED-CS-S-98-7 and the Fragmentation Characteristics Database with DDESB TP 16.

c. Barricades. There are a number of approved barricades that may be used for the mitigation of fragments, such as the open front barricade, enclosed barricade, and the miniature open front barricade. A comparison, siting, and selection procedure for various barricades can be found in HNC-ED-CS-S-96-8, Revision 1.

d. Water Barriers. In some instances it may be necessary to use water as a mitigating agent for the control of blast effect and fragment containment resulting from the intentional detonation of munitions. HNC-ED-CS-S-00-3 contains the requirements necessary when using water as a mitigating agent. Munition

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specific requirements are available in the Fragmentation Characteristics Database with DDESB TP 16.

e. Contained Detonation Chambers. Another engineering control that may be proposed for the intentional detonation of MEC is a Contained Detonation Chamber (CDC). CDCs are designed to capture all fragmentation from the detonated MEC and will be approved by DDESB for the intentional detonation of MEC.

I.2.P USE OF DDESB TP 16 FOR DETERMINATION OF EZs

I.2.P.01 DDESB TP 16 details the approved methods for the calculation of the MFR-H, the HFD (i.e. 1/600 distance), and the BEM. There is a Fragmentation Characteristics Database, an EXCEL Spreadsheet for the “default” distances based on diameter and net explosive weight for items not in the database, and an EXCEL Spreadsheet for the BEM associated with DDESB TP 16. The DDESB TP 16, the database (and instructions for its use) and the spreadsheets are all available on the DDESB Website (go to www.ddesb.pentagon.mil). All personnel involved in MEC response actions should ensure that they have a login and password for this website.

I.2.P.02 The DDESB TP 16 Fragmentation Characteristics Database includes all distance information required for determining the MSD as well as information required for engineering controls for many munitions.

I.2.P.03 If a munition is not listed in this database, there are Tables in DDESB TP 16 for determining the MFR-H and the HFD based on either munition diameter or NEW.

I.2.Q ESP, ESS, and CSS

I.2.Q.01 DoD 6055.09-STD, Ammunition and Explosives Safety Standards and DA Pamphlet 385-64 require the preparation, submittal and approval for ESP/ESS/CSS for USACE MMRP work in the following circumstances:

I.2.Q.01.01 A DDESB-approved site plan, ESS, or CSS before the start of munitions response activities (such as field activities) that involves the placement of explosives on a site; the intentional physical contact with MEC or chemical agents (CA) regardless of CA configuration; or the conduct of ground-disturbing or other intrusive activities in areas known or suspected to contain MEC or CA; or

I.2.Q.01.02 A USATCES-level explosives safety office review and approval pending DDESB review and approval provided the submission is at DDESB for review and approval and the USACE accepts that the DDESB approval may impose different or additional munitions or CWM response requirements.

I.2.Q.02 An ESS/CSS is required for the following types of MMRP work:

- a. A determination of NDAI;
- b. TCRA;
- c. Construction Support for those locations where the probability of encountering MEC has been determined to be moderate to highly probable;
- d. Execution of the explosives safety or CA safety aspects of the selected response (post investigative/characterization work);
- e. Institutional/Engineering Controls; and/or
- f. CSS.

I.2.Q.03 An ESS/CSS/ESP/chemical site plan (CSP) is not required for:

- a. Munitions or explosives emergency response;
- b. Preliminary assessments (PA) or site inspections (e.g., site visits in conjunction with an archival search) when intentional

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physical contact with MEC or CA or the conduct of ground-disturbing or other intrusive activities is not intended;

c. Clearance activities on operational ranges. (Addressing MM burial sites on operational ranges is not a clearance activity);

d. Munitions response of former ranges used exclusively for training with small arms ammunition; or

e. On-call construction support – “Low Probability”. “Stand-by” construction support is appropriate.

(1) A “low” determination may only be assigned to those areas for which a search of available historical records and onsite investigation data indicates that, given the military or munitions-related activities that occurred at the site, the likelihood of encountering MEC or CA, regardless of CA configuration, is low.

(2) Munitions-related activities that may merit a “low” determination include, but are not limited to, the former use of the area for live-fire training exclusively with small arms ammunition; for maneuver training, to include maneuver training involving the use of smokes, pyrotechnics, and simulators; as firing points; for munitions inspection, handling, storage, or transfers, to include residue points and inert storage yards; for air defense; or as munitions operating facilities. The exceptions are facilities in which the processes used might have resulted in the generation of concentrations of munitions constituents high enough to present an explosive hazard. Areas on which previous responses have been completed may also qualify for “low” determinations.

(3) Immediate reassessment by the responsible authority of the level of construction support required is appropriate upon the discovery of MEC or CA, regardless of CA configuration.

f. Anomaly avoidance activities.

(1) The use of anomaly avoidance techniques is appropriate on properties known or suspected to contain UXO or other munitions

[such as for DMM] that may have experienced abnormal environments to allow the below activities in such areas while avoiding surface explosive or CA hazards and, when necessary, subsurface anomalies. Anomaly avoidance is used when:

(a) Surface MEC or CA, regardless of CA configuration, will be avoided during any activities that require entry to the area (for example, collections of environmental samples, the conduct of cultural resource studies).

(b) Subsurface anomalies will be avoided during any intrusive work (such as drilling environmental monitoring wells).

(2) During anomaly avoidance:

(a) Escort support must be provided by EOD personnel, or:

(b) Within areas known or suspected to contain MEC, excluding CA, regardless of configuration, by:

(i) UXO-qualified personnel; or

(ii) UXO Technician I personnel under the supervision of UXO-qualified personnel. The responsible commander or authority may, based on a risk assessment and implementation of methods to mitigate any potential exposures, approve UXO Technician I personnel to perform escort duties without supervision.

(c) Within areas known or suspected to contain CA, regardless of configuration, to include areas where such CA is commingled with other MEC, by UXO-qualified personnel trained in CWM responses.

(3) Explosives safety requires that discovered surface MEC or CA, regardless of CA configuration, be avoided and their location noted and reported to appropriate authorities.

(4) Detected subsurface anomalies must not be investigated, but they shall be marked, when appropriate, and avoided.

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I.2.Q.04 Format and contents of ESS/CSS. Call the EM CX for additional guidance and information on the submittal of ESS/CSS.

I.2.Q.04.01 Non-Time Critical Removal Action (NTCRA).
> **See Appendix V.**

I.2.Q.04.02 Time Critical Removal Action (TCRA).
> **See Appendix W.**

I.2.Q.04.03 No DoD Action Indicated (NDAI) or No Further Action (NOFA).
> **See Appendix X.**

I.2.Q.04.04 Construction Support.
> **See Appendix Y.**

I.2.Q.04.05 Institutional/Engineering Controls.
> **See Appendix U.**

I.2.Q.04.06 Chemical Safety Submission (CSS).
> **See Appendix T.**

I.2.Q.04.07 Explosive Siting Plan (ESP).
> **See Appendix P.**

I.2.Q.05 Not Used.

I.2.Q.06 Not Used.

I.2.Q.07 Not Used.

I.2.Q.08 Not Used.

I.2.Q.09 Not Used.

I.2.Q.10 There are several contract DIDs in place for past, present, and future contracts with USACE for MMRP work, as well as Interim Guidance Documents (IGD). Some of these IGD/DIDs

prescribe certain formats and contents for these types of documents. In case of conflict between the DoD Standard and USACE policy and contractual documents, contact the EM CX for clarification.

I.2.Q.11 For categories of changes to site plans and safety submissions refer to paragraph I.1.A.03.07.

I.2.Q.12 Routing for site plans/submissions is as follows:

I.2.Q.12.01 FUDS.

a. The Design Center will submit the plan/submission to the EM CX for the DRU approval memorandum.

b. The EM CX will forward on to USATCES. The EM CX will resolve any comments with USATCES.

c. USATCES will forward onto DDESB with an Army approval memorandum.

d. USATCES will usually resolve any comments with DDESB.

I.2.Q.12.02 BRAC.

a. The Design Center will submit a Corps or Corps contractor generated ESP/ESS for work done on BRAC installations to the EM CX for review and DRU approval memorandum for the Corps organization's participation in the project activities, from an explosives safety perspective.

b. Normally, the BRAC will submit the ESP/ESS up through their chain of command for review and approval and from their chain of command to USATCES for Army review and approval; Naval Ordnance Safety and Security Agency (NOSSA) for Navy review and approval; and the Air Force Safety Center (AFSC) for Air Force Review.

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c. If the BRAC office wants USACE to submit the ESP/ESS up through the chain of command for the Service review and approval, the BRAC office will need to designate this in a memorandum or an e-mail attesting to this and that document will become part of the submittal package up to the Service office.

d. If the Design Center is performing this function for the BRAC, provide the BRAC request, when the ESP/ESS is submitted for the USACE review and approval to the EM CX.

I.2.Q.12.03 Active DoD installations. The servicing Design Center will follow the process and procedures in paragraph I.2.Q.12.02, except substitute Installation point of contact in lieu of BRAC.

I.2.Q.12.04 Work for Others (WFO). If work is being done that involve an ESP/ESS in WFO, the ESP/ESS will be submitted to the EM CX for DRU approval before being sent to the customer.

I.2.Q.13 Review and Approval Timelines. Normally, the review and approval for USACE ESP/ESS, at USATCES will take approximately 2 weeks, once USACE provides them with a high quality document and all comments are resolved. Review and approval times at other Service safety offices are variable. DDESB review and approval for ESP/ESS is normally 2 weeks for FUDS. Due to the nature and number of different offices involved in Active and BRAC facilities and installations that duration is variable as well.

I.2.Q.14 Interim Army Approvals. In the event a project timeline cannot be controlled or a response approval is needed that would require lesser time, as identified above for the review and approval, the requesting organization can request an Interim Army Approval to begin the work ahead of the DDESB approval. This request will need to identify the reason an interim approval is being requested. Normally this can be the inordinate cost to the project should work not be started by a certain date or political pressure to begin work as soon as possible, as an example.

I.2.Q.14.01 USATCES can grant an Interim approval in these cases. This Interim Approval is predicated on the requestor being aware of the following conditions that may be imposed upon the project team in this event:

- a. The proposed ESP/ESS is at DDESB for review and approval, and
- b. The Service accepts that the DDESB approval may impose different or additional munitions response requirements.

I.2.Q.15 Per the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and Defense Environmental Response Program (DERP) and FUDS guidance, An Action Memorandum (AM) or Decision Document (DD) will precede an ESS/CSS for a Response Action. The safety submission will parrot the selected removal response in the AM/DD. An AM/DD is not required for an ESP.

I.2.Q.16 After-Action Reports (AAR). An After-Action Report is required for all completed munitions responses that have a DDESB approved ESS/CSSs. > ***See paragraph C12.7 of DoD 6055.09-STD and EP 385-1-95b for format and content.***

I.2.Q.17 All FUDS site plans and submissions will be submitted electronically to the EM CX. For large files, (in excess of 5 megabytes) place the file on a file transfer point (ftp) and notify the EM CX via e-mail of the location, file name, log-in, password, and the length of time the file will be on the ftp and when it is available for download. Once it is downloaded, the EM CX will notify the sender, via e-mail, when it has been downloaded and the review process has started.

I.2.Q.17.01 The EM CX has had very successful results using the Aviation and Missile Research Development Engineering Center (AMRDEC) ftp for uploading large electronic files, specifically site plans and submissions with maps and figures. This ftp: <https://safe.amrdec.army.mil/SAFE/> will require you to manually enter each recipient's e-mail address, and manually upload the files

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to their website. The process is very user-friendly. The best feature of this website is that you can select to be notified when the file has been downloaded by the person you sent it to, and the system will generate a specific password to that receiver for them to use to download the document, a very safe ftp. You can have the notification sent to civilian contractors' e-mail as well. If you choose to send the notice to a non ".mil" e-mail address, you will have to use your Army Knowledge On-line (AKO) log-in to permit the ftp to notify the recipient via e-mail to go in and pick up the files.

I.2.R Not Used

I.2.S PRE-OPERATIONAL SURVEYS

I.2.S.01 All USACE Recovered Chemical Warfare Materiel (RCWM) projects will have a Pre-Operational Survey, hereafter called "Survey", conducted and successfully completed on the site prior to any intrusive activities. Headquarters, United States Army Corps of Engineers (HQUSACE) is responsible for the execution of the Survey, as the DRU. HQUSACE has delegated the responsibility for the conduct of the Survey to the Commander, U.S. Army Corps of Engineers, U.S. Army Engineering and Support Center (CEHNC), Huntsville, Huntsville, Alabama. The Environmental and Munitions Center of Expertise (EM CX) within CEHNC will lead the Survey.

I.2.S.02 All planned RCWM response actions must undergo a Survey prior to the start of operations. This includes sampling efforts, if the intent is to dig to an anomaly, and there is a potential to encounter RCWM, or if provisions are made to store RCWM. Surveys are valuable and necessary tools in the preparation of chemical agent operations at response action projects. Surveys are intended to judge the readiness of those organizations performing response actions activities to operate in a safe and healthful manner and are the final step in gaining approval to conduct operations. Surveys are not training events, nor are they the time to draft safe work procedures. It is the responsibility of the Project Manager (PM) to have response personnel fully trained,

practiced, and prepared for the Survey prior to arrival of the Survey team.

I.2.S.03 The Survey evaluates planned activities relative to safety, health, environment, and operational readiness and recommends whether the planned activities should be allowed to transition to chemical agent operations. Survey teams will consist of subject matter experts from the organizations listed below, as available. The Survey will be conducted under the direction and control of the U.S. Army Corps of Engineers. Survey team members will be selected based on technical background and areas of expertise. The Project Delivery Team (PDT) consists of any personnel responsible for the execution of the project on the ground. Under no circumstances will members of the PDT serve as evaluators on the Survey Team. This is necessary to preclude any possibility of biased participation. The EM CX will select the team members and serve as the Survey Team Leader. The organizations below will be invited to participate in the Survey. However, based on availability, the minimum acceptable number of personnel required to participate on the Survey team as evaluators will be three: the EM CX (lead), one participant from the United States Army Technical Center for Explosives Safety (USATCES), and one from any of the other organizations identified as evaluators listed below:

- a. The PM for the site (both District and CEHNC) or Installation Commander (non-evaluator).
- b. U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM) (evaluator).
- c. Each agency responsible for executing on-site RCWM activities (e.g., The 22nd Chemical Battalion TE (Technical Escort Unit), U.S. Army Research Development and Engineering Command, Edgewood Chemical and Biological Command (ECBC) (evaluator).
- d. Program Manager for the Elimination of Chemical Weapons (PMECW) (evaluator).

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e. HQ USACE Safety and Occupational Health Office (CESO) (evaluator).

f. For active installations and BRAC project sites, or Work for Others, the corresponding Safety offices will be invited to attend (non-evaluator).

I.2.S.04 Surveys will examine all aspects of chemical agent operations and emergency response activities. The Survey team will review pertinent documentation, inspect selected processes, support equipment and facilities, as appropriate, and witness selected activities and operations. Operations during Surveys will be conducted as though chemical agent and/or explosives were present. If specific simulations or deviations from this concept are required, they must be approved by the Survey team leader before the start of the Survey and explained in the Survey report. The need for significant simulations or deviations may indicate that the system is not ready to operate, precluding successful completion of the Survey (e.g., having to simulate that the chemical agent filtration system (CAFS) (if used) is fully operational due to mechanical difficulties, or other similar instances). All approved Standing Operating Procedures (SOPs), WPs, checklists, maps of the project site, a copy of the Chemical Safety Submission (CSS) and approval documents, environmental requirements, security plan, and other documentation will be provided to team members prior to the Survey. Any documentation needed by or requested by Survey team members will be made available on site or, if requested, prior to the Survey. Fourteen days prior to the projected date of the Survey, the PM will provide 5 CDs with copies of all site documents discussed above to the EM CX for distribution to the Survey Team Members.

I.2.S.05 Deliberate unearthing, exposing, accessing, or contacting RCWM is not permitted until all required CSS approvals are obtained and a Survey has been successfully completed.

I.2.S.06 Operational personnel will perform a dry run in the presence of EM CX and Site Safety personnel prior to the restart of any RCWM operation that has not been conducted in the last 90

days. The EM CX, in coordination with project safety personnel, will determine the actions required to verify readiness. These actions will be based on the scope of operations and length of delay between the initial Survey and the re-start of operations and may result in conducting another Survey.

I.2.T DETECTION METHODS AND EQUIPMENT

> *See EM 1110-1-4009.*

I.2.U MECHANIZED MEC PROCEDURES

I.2.U.01 Sifting Operations.

I.2.U.01.01 When sifting operations are being conducted, essential personnel will be afforded blast and fragment protection through the use of shielding, PPE, and/or distance. The requisite shielding is identified within the fragment calculation sheet from the Fragmentation Database for the MEC item(s) expected to be encountered. > *See DDESB TP 16.* Additionally, all essential personnel will be provided K24 overpressure protection via PPE or distance.

I.2.U.01.02 All sifting operations will have the capability of being remotely shut down from a "Kill" switch located at, or outside of the K24 distance.

I.2.U.01.03 All non-essential personnel will be kept outside of the Maximum Fragment Range-Horizontal during mechanized MEC procedures involving sifting.

I.2.U.01.04 All safety plans involving sifting operations will include procedures on how to handle MEC items that are discovered within the sifting mechanical structures.

I.2.U.02 Dredging Operations.

I.2.U.02.01 Explosive safety concerns from MEC exposures in a dredging environment are similar to those on land. In addition to the normal heat, blast, shock, and fragmentation effects of a detonation

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on land, the consideration of the effects of a detonation underwater must also be taken into account. The blast wave from underwater detonations can amplify the damage to the superstructure being used for dredging operations.

I.2.U.02.02 One of the key points of any dredging operation is to prevent the MEC from getting to the surface of the barge and or shoreline. This can be done through installing screening devices onto the cutter heads or dredging heads to limit the flow of any subsurface debris or items through the ducting of the dredging system. Normally the screening restrictions are designed to permit the maximum flow of material and water and prevent any items that meet certain physical dimensions from entering the flow of material. This size is normally determined by the smallest size of MEC anticipated to be encountered.

I.2.U.02.03 Underwater blast calculations can be obtained from the EM CX for determining shielding, distance requirements, etc., for underwater MEC considerations.

I.2.U.02.04 Recovered MEC from dredging operations may require disposal on the barge or platform conducting the dredging, or when it gets deposited on the barge/beach area. Dredging operations that have knowingly or inadvertently dredged MEC items during sediment placement may require an MEC clearance operation to reduce the exposure of the public and site workers to MEC hazards. Contact EM CX for additional assistance in this area.

I.2.U.02.05 An ESS/ESP may be required for the MEC operation involving dredging techniques. Contact EM CX for additional assistance in this area.

I.2.U.02.06 The potential for encountering MEC on any dredging project that is classified as 'new work' is moderate to high. Maintenance dredging, in previously dredged areas, will not normally be expected to encounter MEC unless the dredging site is within an active range area.

I.2.U.03 Earth Moving Machinery (EMM) Procedures.

> See EP 385-1-95a.

I.2.U.03.01 For Removing Soil Overburden.

a. EMM may be used to excavate overburden from suspected MEC. EMM will not be used to excavate within 12 inches of a suspected MEC. Once the EMM is within 12 inches of the suspected MEC, the excavation will be completed by hand excavation methods. Personnel who are not UXO-qualified may operate EMM only when supervised by a UXO Technician III or higher.

b. If more than one earth-moving machine is to be used onsite, the same minimum separation distances required for multiple work teams apply.

c. EMM operations will be conducted within the guidelines of EM 385-1-1 and 29 CFR 1926, subpart P.

d. There is no need to harden/shield the EMM to protect its operator when EMM is used to remove the soil overburden to within 12 inches from the anomaly.

I.2.U.03.02 For Intentional Excavation of MEC.

a. Procedures for use of heavy equipment (earth moving machinery or EMM) to assist in the excavation of Munitions and Explosives of Concern (MEC).

(1) If the intent of the Mechanized MEC procedure is to intentionally dig up anomalies that could be MEC, without practicing anomaly avoidance techniques, the equipment must be hardened/armored appropriately and the operator must be afforded protection for blast overpressure to the K24 factor by either distance or PPE. Using hearing protection that will reduce the sound by ≥ 9 will reduce the distance to the K18 factor.

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(2) If mechanized MEC procedures are being performed, the MSD for unintentional detonations for non-essential personnel will be the MFR-H.